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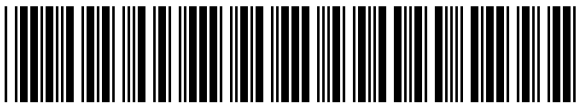

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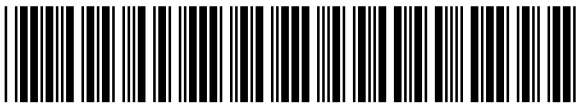

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Donning red underwear to play mahjong: superstitious beliefs and problem gambling among Chinese mahjong players in Macau[1]

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Abstract

One hundred and fifty eight mahjong players in Macau completed a questionnaire on superstitious beliefs and the Canadian Problem Gambling Index (CPGI). It was hypothesised that mahjong superstition and education level would predict problem gambling. Problem gamblers scored significantly higher on superstitious beliefs than non-problem gamblers. A hierarchical regression analysis indicates that education level and mahjong superstition together predict problem gambling. The largest portion of the variance in problem gambling was accounted for by superstition. However, demographic predictors such as sex, age group, income, and relationship status were unrelated to problem gambling. Further, a logistic regression analysis showed that mahjong superstition scores correctly classified 95.1 % of problem gamblers and 93.4% of non-problem gamblers. The current findings suggest that superstitious beliefs may play a significant role in the maintenance of problem mahjong gambling.

Keywords: mahjong, superstitious beliefs, Chinese culture, problem gambling

Introduction

Gamblers are known to subscribe to various superstitions (e.g., Gaboury & Ladouceur, 1989; Ladouceur & Walker, 1996; Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997; Walker, 1992). Gambling researchers argue that superstitions and cognitive distortions are related to the frequency of gambling participation as well as problem gambling (Joukhador, Blaszczynski, & Macallum, 2004). Several studies have, for example, shown that erroneous cognitions play a role in the maintenance of problem gambling for electronic gaming machine gamblers (Delfabbro & Winefield, 2000; Walker, 1992). A more recent study by Lambos and Delfabbro (2007) further demonstrated that irrational beliefs and cognitive biases, rather than lack of numerical reasoning ability, predicted problem gambling, whereas Caron and Ladouceur (2003) have shown that irrational beliefs and cognitive biases expressed by others can also increase a gambler's risk taking.

The diverse superstitions held by gamblers also provide clues to understand how gamblers explain winning and losing. Superstitions tend to fill in the gap between reality and hope and

serve to maintain perceptions of control over unpredictable outcomes (Langer, 1975; Rothbaum, Weisz, & Snyder, 1982). In games such as mahjong, specific types of behavioural superstitions can be observed among players as a means to control undesirable turns of events. Such superstitions include the washing of hands when one suffers a series of losses and going to the bathroom as an attempt to change one's luck. Similar rituals are observed in sports. For example, there are more superstitions and rituals about batting and pitching in baseball in comparison to fielding (Gmelch, 1971, 2006). Superstition is also more commonly observed in team sports in comparison to solitary sports such as swimming, suggesting that social factors or lack of direct individual control may also be influential factors.

Both general and game-specific superstitions are also shaped by cultural traditions and experiences. For example, some Thai lottery players believe that the clues for the winning numbers are hidden in the trees or in a water stream in the garden of a Buddhist temple (Ariyabuddhiphongs & Chancherlemporn, 2007). Griffiths and Bingham's (2005) classification of superstitions, general or game-specific, is based on the surface content analysis of superstitious beliefs, but superstitious beliefs also can be examined as cultural schemas: those which are universal and those which are culture-specific.

In a qualitative inquiry on Vietnamese-Australian gamblers, Ohtsuka and Ohtsuka (in press) reported that Vietnamese-Australian gamblers held both universal and culture-specific schemas to explain luck and winning in gambling. More specifically, the authors assert that the Vietnamese-Australians regard gambling success (winning) as associated with positive internal qualities such as intelligence and skill, whereas failure (losses) was attributed to external factors such as distraction or bad luck. The authors argue that this attribution pattern is a universally observed schema and therefore, not necessarily culturally specific. However, they reported that the notion of karma was also used to explain winning and loss. This notion that gambling wins and losses originate from gamblers' previous actions is indeed culture-specific.

The role of culture in contributing to gambling has been reviewed by Raylu and Oei (2004). In an extensive review of culture and gambling, the researchers argue that certain cultural groups are more likely to gamble than others. In other words, cultural values and beliefs, the process of acculturation, enculturalization as home culture learning, and the influence of culturally determined help-seeking behaviour can play an important role. Although the cultural influence on superstition is not systematically explored, Raylu and Oei (2004) do not preclude the possibility that cultural beliefs may contribute to the maintenance of irrational thinking.

Similarly, Papineau (2005) argues that the patterns of Chinese gambling are a reflection of their cultural views. She asserts that the traditional beliefs in luck and fate as the basis of one's destiny predispose the Chinese to gambling. In this regard, Chinese have a tendency to attribute success in gambling to luck or *ming* in general. Her explanation of luck or *ming*, however, is less convincing regarding the maintenance of gambling behaviour and development of problem gambling among Chinese. If Chinese attribute winning to luck and emphasise external locus of control in explaining gambling success, they are less likely to develop problems with gambling as their levels of Illusion of Control are lower compared to non-Chinese. That is, if it is just luck that governs a person's success or failure in gambling, why should one chase one's luck after repeated failure? Obviously, the Chinese notion of luck might not be always static and thus can be attributed to the external locus of control only. Rather, Chinese gamblers may actively try their luck and therefore may attribute their gambling wins to their personal characteristics (e.g., insight or skills). Papineau's analysis on Chinese's notion of luck, however, appears to explain

the popularity of mahjong among Chinese. Compared to the game of poker, mahjong relies more on luck than skill because the quality of the initially dealt hand is likely to determine the winner of the round. Further, unlike poker, bluffing in mahjong plays a lesser role as it only helps to deceive other players regarding one's intention as to which melds you are trying to construct. It is impossible in mahjong to win all the way by bluffing alone.

Mahjong, although a popular Chinese game, has not been well researched by gambling researcher. The traditional game of mahjong, played among friends and family members, is a widely accepted form of family entertainment, which is regarded as a benign form of gambling because of its social nature. Zheng, Walker and Blaszczynski (2008) report that mahjong gambling is popular in the Chinese community in Sydney, Australia. In a series of studies, the researchers estimate the percentage of problem gamblers in the Chinese community in Sydney to be 2.9% to 3.8%. In their sample, male gamblers outnumber female counterparts. Further, problem gamblers were more likely to ascribe to common superstitions like *Feng Shui*, beginner's luck, unstoppable winning streaks and specific phases of good and bad luck. Their study, however, did not elaborate on whether specific behavioural superstitions were linked to problem gambling. Also, the issue of Chinese cultural factors in shaping these superstitious beliefs need more clarification.

In this study, we focus on superstitious beliefs expressed by Mahjong players in Macau. Mahjong is a game of skill originated in China. It is usually played by four players at a mahjong table. From four walls (decks) of faced-down mahjong tiles, the players take turns to draw a tile to add to their dealt hand and discard an unwanted tile. The objective of mahjong is to win each round of play by constructing the hand (a meld) that earns the highest points before other players do. The strategy and skill to build a hand quickly is important as well as the ability to guess other players' intentions by observing discarded tiles. Players also need to consider a trade off between high scores, which can only be achieved by collecting rare tile versus the speed for constructing a winning hand because the first player to do so would win more points and more money.

Mahjong is traditionally a game shared by friends and relatives during festivals, parties and family gatherings. Mahjong is generally considered as the most popular board game played at the Chinese home and is generally viewed as an acceptable form of social interaction and entertainment (Arthur, Tong, Chen, Hing, Sagara-Rosemyer et al., 2008; Chan, Ohtsuka & Chan, 2008). Although some may regard mahjong as a benign form of gambling because it is played at home or at mahjong parlours, the mahjong players normally play for monetary gains not just for points. In Taiwan, the police routinely crack down mahjong parlours as the game of mahjong involving the exchange of money is considered gambling (Festa, 2007). In fact, a large percentage of treatment seeking female gamblers in Hong Kong/Macau report mahjong gambling as well as casino table gambling as their predominant forms of gambling activities (Tang, Wu, & Tang, 2007).

There are a number of variations of mahjong, which are played in different countries. Each version carries slightly different scoring methods and rules. Among all versions of mahjong, the Cantonese mahjong is the most common form, and it still is the dominant family game among Chinese in Hong Kong and Macau (The Hong Kong Polytechnic University, 2001, 2005). Chinese emigration and diaspora spread the Cantonese mahjong to other parts of the world as well. Indeed, mahjong is a game that is arguably the closest to Chinese's heart. Even a few Hong Kong movies were produced around the theme of mahjong and mahjong masters in search of a way of mahjong, fame and fortune (Chan & Ohtsuka, 2010; Ohtsuka & Chan, 2009). Myths regarding the origins of mahjong are many; however, one of the such widely believed myths regarding the origin of the game even gives credit to Confucius, the great Chinese philosopher, for inventing

mahjong around approximately 500 B. C. Despite elaborate analogies drawn between patterns of mahjong pies and elements of Confucian philosophy, no historical evidence exists to support this claim. However, it is interesting to note that the Chinese regard mahjong with the same degree of respect and reverence that are reserved for one of the greatest Chinese philosophers.

The present study aims to investigate the relationship between the superstitious beliefs and problem gambling among Chinese mahjong players in Macau. In particular, we hypothesize that (a) mahjong superstition would predict problem gambling; (b) problem gamblers would endorse more superstitious beliefs than non-problem gamblers and (c) the levels of superstitious beliefs would assist identifying probable problem gamblers.

Method

Participants

A sample of 158 participants (103 males, 55 females) took part in the study. The participants were recruited from the community of Macau Special Administrative Region, People's Republic of China. The age of participants ranged from 21 to 50, with the largest age group being 21-25 years old (n = 55). Frequencies of other age groups were: 26 to 30 years old (n =17), 31 to 35 years old (n = 14), 36 to 40 years old (n=22), 41 to 45 years old (n=5), and 46 to 50 years old (n=45). With respect to marital status, 64.6% of the participants (n =102) were single, 34.8% (n=55) were married and one participant (0.6%) was divorced. By grouping divorced with singles, a new dichotomous variable, relationship status, was created for further analysis. The majority of the participants were educated at the secondary level (53.2%, n=84), followed by those who had a university degree or some partially completed university studies (29.1%, n=46) but 17.7% of the participants had only completed primary education (n= 28). About half of the participants (48%, n=76) had a monthly income range of MOP[1] 10,000-15,000 (A$ 1,439 –2,158). Approximately 25% of the participants (n=39) reported slightly higher monthly income range of MOP 15,001-20,000 (A$ 2,158 - 2,877) and 17% (n=27) of the participants earned slightly less in the range of MOP 5001 – 10,000 (A$ 720 – 1,439). Four percent (n=6) of the participants only earned the income range of less than 5,000 MOP (A$ 719), whereas, 6.3% (n=10) of the participants reported the highest monthly income range of MOP20,001 – 25,000 (A$ 2,877 – 3,597).

Measures

Mahjong superstition scale (Chinese). A self-completion questionnaire on superstitious beliefs of mahjong in Cantonese was administered to the participants (See Appendix). The superstitions selected for the questionnaire were chosen based on previous research as well as focus group discussions with mahjong players in Macau. Some examples of superstitious beliefs included "to wash hands or urinate to reverse bad luck," "taking a seat with a straight back," or "go to the bathroom turn the underwear inside out to reverse bad luck" and "wearing red underpants to strengthen luck." There are 15 specific superstitious beliefs related to mahjong (see Appendix).

[1]Macau Patacas – Official Currency of Macau; A$1 (AUD) = 6.95MOP as at 6 February 2010.

Participants indicated a degree of agreement on each statement using a seven-point Likert-type scale (1 = very strongly disagree, 2 = strongly disagree, 3 = disagree, 4 = not sure/don't know, 5 = agree, 6 = strongly agree, and 7 = very strongly agree). Higher levels of mahjong superstition scale scores represent higher levels of mahjong superstition. In the current study, Cronbach's alpha was .86. Individual item analysis showed that the Cronbach's alpha value was in the range of .85 to .86 if any item were removed. Therefore, all 15 items reliably contributed to the Mahjong Superstition Scale.

An exploratory principal component factor analysis using Varimax Kaiser Rotation extracted three factors from mahjong superstition scale data (see Table 1). Rotations converged in eight iterations. Three factors account for a total of 48.52% of the variance in the data. Factor 1 (accounting for 19.12% of variance) loaded highly with superstitions regarding avoiding haircuts before playing mahjong, preferred seating arrangements, the color of underwear, and the prohibition of a mahjong move that has a phonetic association with the Chinese word "death." Factor 2 (accounting for 15.76% of variance) had high loadings for superstitions relating to changing luck with turning underwear inside out, avoidance of expressions associated with losing money during the game, and the starting a round of a mahjong game with an unaided win (i.e., a player draw the last mahjong pie rather than picking up a discarded pie by other players). Factor 3 (accounting for 13.67% of variance) had high loadings with superstitions about changing luck by washing hands or with a bathroom break.

Canadian Problem Gambling Index Short-Form (CPGI) (Ferris & Wynne, 2001) was translated in Chinese (Traditional Characters, Hong Kong). The CPGI measures the degree of gambling severity using a series of items relating to gambling behaviours and possible harms associated with gambling. In recent years, it has become one of the preferred instruments for identifying problem gamblers in Australia. (e.g., Stevens & Young, 2008; Young & Stevens, 2008). Participants respond to a series of statements on a four-point scale (0=never, 1 = sometimes, 2 = most of the time, 3= almost always) and are asked how often these statements have applied in the previous 12 months. Higher CPGI scores (range 0-27) indicate more severe problems with gambling. Scores of 8 or greater indicate problem gambling indicating the greater extent of negative impact of gambling. In the current study, the Cronbach's alpha for the CPGI was .82.

In addition to CPGI and the superstitious beliefs, basic demographic information such as age, sex, marital status, educational level and income were recorded in the questionnaire.

Procedure

A convenience sample was drawn from the community of Macau. The second author who teaches at a University in Macau recruited participants from regular mahjong players. The prospective participants were informed about the purposes and intentions of the current investigation. Consent forms were given for their perusal and on agreement to participate; the participants signed consent forms and returned them to the researcher. The participants who agreed to participate then completed questionnaires. No monetary compensation was provided for the participation.

Table 1. Factor loadings for Exploratory Factor Analysis with Varimax Kaiser Rotation of Mahjong Superstition Scale

	Factor		
Mahjong Superstition Scale Item	**1**	**2**	**3**
If you play mahjong right after a haircut, you will lose money.	.80	.13	.05
The seat with the straight back carries the notion that you have something to depend on. And that can increase your luck.	.58	.17	.26
Don't sit by the door as you will lose money.	.55	.27	.28
When you play mahjong, you should wear red underpants. This can strengthen your luck.	.54	.44	-.03
Don't lend money to others before mahjong games, or you will lose money.	.53	.45	.09
When three players already discarded the tile "West," the fourth player cannot discard the tile "One Tube." If you do, all players will die.	.49	-.11	.43
The last player among the four would score most in the last round of a mahjong game.	.49	.23	.21
If you concentrate hard enough, you can draw any mahjong tile that you wish.	.48	.30	.40
When you are losing during mahjong games, you should turn your underwear inside out. This can help reversing bad luck.	.05	.79	.14
When you play mahjong, don't utter any word that implies losing money (including homophones with losing money).	.26	.68	.11
In the first round of the mahjong game, you should score by drawing your own hand.	.27	.55	.23
When you are losing, you should go to the washroom and urinate as this would reverse your bad luck.	.04	.30	.70
When you are losing, you should wash your hands in the bathroom as this would help changing your luck.	.10	.13	.64
Don't let anyone touch your shoulder; this will take away luck.	.28	-.01	.53
When you are on a roll, don't leave your seat no matter what, as this can help holding your luck.	.26	.45	.49

Results

The data were compiled, coded and entered in a data file that was analysed with the PASW (Predictive Analytics Software) program, Ver. 17. All statistical tests used an alpha level of .05. Exact *p*-values are reported where possible while in the case of software-generated $p = .000$, which is an unknown value between $p < .0005$ and $p > .0000$ (Levine & Atkin, 2004), is reported as $p < .001$ as recommended in the Publication Manual of the American Psychological Association, 6th ed. (American Psychological Association, 2009).

Gambling Behaviour of the Sample

The mean score on the CPGI (potential range 0 – 27) was 10.07 (SD = 6.84), the mode was 5 and the median CPGI 10. The distribution of scores for the CPGI was bimodal and was comprised of a cluster of moderate, low, and no-risk gamblers (48.1%, n =76) and another cluster of problem gamblers (51.9%, n = 82). The mode CPGI score for the problem gamblers who scored 8 or more on the CPGI was 13.5. Overall, half of the participants gambled at levels that appear to be leading to harm.

Mahjong Superstition Scale

The mean superstition score was 53.7 (SD = 15.75). The median superstition score was 56.0 and the mode was 65. The shape of mahjong superstition score distribution was similar to the shape of the double-peaked CPGI distribution. Table 1 shows the mean superstition scores for each item by problem and non-problem gamblers. Even after the Bonferroni adjustment to keep the set-wise Type I error rate to .05 (i.e., an alpha was reduced to .0033 for all 15 *t*-tests), problem gamblers supported all superstition items significantly more than did non-problem gamblers.

Table 2. Mean mahjong superstition item scores for problem gamblers and non-problem gamblers

Mahjong superstition item		**Problem gamblers (n=82)**		**Non-problem gamblers (n=76)**	
		***M* (*SD*)**	**95% CI [LB, UB]**	***M* (*SD*)**	**95% CI [LB, UB]**
1.	In the first round of the mahjong game, you should score by drawing your own hand.	3.91(1.68)	[3.55, 4.28]	2.58 (1.64)	[2.20, 2.95]
2.	The last player among the four would score most in the last round of a mahjong game.	4.20 (1.81)	[3.80, 4.59]	2.49 (1.44)	[2.16, 2.82]
3.	Don't sit by the door as you will lose money.	4.24 (1.72)	[3.87, 4.62]	2.12 (1.21)	[1.84, 2.40]
4.	When you are losing, you should wash your hands as this would help changing your luck.	4.38 (1.69)	[4.01, 4.75]	2.88 (1.68)	[2.50, 3.27]

Table 2 (continued). Mean mahjong superstition item scores for problem gamblers and non-problem gamblers

Mahjong superstition item		Problem gamblers (n=82)		Non-problem gamblers (n=76)	
		M (*SD*)	95% CI [LB, UB]	*M* (*SD*)	95% CI [LB, UB]
5.	When you are losing, you should go to the washroom and pee to reverse your bad luck.	4.34 (1.52)	[4.01, 4.67]	2.99 (1.51)	[2.64, 3.33]
6.	The seat with the straight back carries the notion that you have something to depend on. And that can increase your luck.	4.44 (1.48)	[4.11, 4.76]	2.38 (1.40)	[2.06, 2.70]
7.	Don't lend money before mahjong games, or you will lose money.	4.65 (1.67)	[4.28, 5.01]	2.57 (1.46)	[2.23, 2.90]
8.	Don't let anyone touch your shoulder; this will take away luck.	4.28 (1.65)	[3.92, 4.64]	2.80 (1.48)	[2.46, 3.14]
9.	When three players discarded the tile "West," the fourth player cannot discard the tile "One Tube." If you do, all players will die.	4.35 (1.66)	[3.99, 4.72]	2.92 (1.70)	[2.53, 3.31]
10.	If you concentrate hard enough, you can draw any mahjong tile that you wish.	4.62 (1.55)	[4.28, 4.96]	2.41 (1.36)	[2.10, 2.72]
11.	When you play mahjong, you should wear red underpants. This can strengthen your luck.	4.56 (1.67)	[4.19, 4.93]	2.79 (1.42)	[2.47, 3.11]
12.	If you play mahjong right after a haircut, you will lose money.	4.71 (1.64)	[4.35, 5.07]	2.62 (1.47)	[2.28, 2.95]
13.	When you are on a roll, don't leave your seat no matter what, as this can help holding your luck.	4.70 (1.55)	[4.35, 5.04]	2.55 (1.35)	[2.24, 2.86]
14.	When you play mahjong, don't utter any word that implies losing money (including homophones with losing money).	4.50 (1.62)	[4.14, 4.86]	2.75 (1.71)	[2.36, 3.14]
15.	When you are losing during mahjong games, you should turn your underwear inside out. This can help reversing bad luck.	4.50 (1.61)	[4.15, 4.85]	3.18 (1.64)	[2.81, 3.56]

Note. Bonferroni procedure was used to keep the set-wise Type I rate to .05. Hence, using an alpha level of .0033, all *t*-tests showed the difference of the mean superstition item scores between problem and non-problem gamblers were statistically significant. That is, problem gamblers supported all 15 superstition items stronger than did non-problem gamblers.

As a preliminary step, correlations among a set of variables were examined using either Pearson correlation or Spearman Rank-Order Correlation analysis depending on the scale of measurement for each variable (i.e., CPGI and Superstition Scale Scores are interval scale data; demographic variables are rank-order or categorical data).

There was a significant correlation between Mahjong Superstition Questionnaire Scores and CPGI scores, r (158) = .81, $p < .001$. Education levels were also significantly related to CPGI scores, r_s (158) = -.42, p < .0 01, the Superstition Scale Scores, r_s (158) = -.31, $p < .001$, and income levels, r_s (158) = .44, p < .001. To reduce multicollinearity, income level was not included as a predictor in subsequent multivariate analysis. These moderate correlations indicate that the higher the educational achievement, the lower the levels of problem gambling scores and those of superstitions, but the higher their levels of weekly income. In addition, moderately large significant correlations were found between the relationship status and the age range, r_s (158) = .58, $p <$. 001. A small statistically significant correlation between the relationship status and the income level, r_s (158) = .21, $p <$ .01. These two rank-order correlations showed that, the older the age of participants, the more likely they are to be married and the higher their weekly income.

To test the hypothesis if the levels of mahjong superstition and demographic variables predict problem gambling (CPGI scores), hierarchical multiple regression analyses were carried out on CPGI score (the criterion variable) using sex, age group, education, income, relationship status, and mahjong superstition questionnaire (MSQ) scores as predictors (See Table 3). In Step 1, a simple regression model with education as a predictor accounted for 16% of the variance in CPGI producing a statistically significant increase (ΔR^2) over the null model (constant only), $F(1, 156) = 30.54$, $MSE = 39.40$, $p < .001$. In Step 2, other demographic predictors were added to this model but the increase in R^2 (ΔR^2) of .01 was not statistically significant, $F(4, 152) < 1$. Nonetheless, the regression model with demographic predictors including education was statistically significant in predicting CPGI accounting for 17% of its variance, $F(5, 152) = 6.42$, $MSE = 39.92$, $p < .001$. In Step 3, mahjong superstition was added to the regression model producing a statistically significant increase in R^2 (ΔR^2), $F(1, 151) = 240.63$, $p < .001$. Mahjong superstition accounted for 51% of the variance in CPGI over the variance explained by demographic predictors in Step 2. A full regression model with mahjong superstition and demographic predictors accounted for 68% of the variance in CPGI, $F(6, 151) = 53.89$, $MSE = 15.50$, $p < .001$. Further, mahjong superstition, $t(151)=15.51$, $p < .001$ and education levels, $t(151)= -3.17$, $p = .002$, are statistically significant independent predictors of CPGI. To summarise, hierarchical regression analyses indicate that mahjong superstition explains by far the largest portion of the variance in CPGI even after the prediction from education was considered.

Table 3. Hierarchical multiple regression analyses predicting problem gambling (CPGI) using mahjong superstition scores, sex, age group, income, and education

Predictor	ΔR^2	B	SE B	ß
Step 1				
(Constant)		18.72	1.64	
Education	.16***	-4.09	.74	-.41***
Step 2				
(Constant)		16.39	2.81	
Education		-4.57	.87	
Sex		1.41	1.10	-.45***
Age group		.07	.30	-.02
Income		.54	.66	.07
Relationship status	.01	-.34	1.34	-.02
Step 3				
(constant)		-5.65	2.25	
Education		-1.81	.57	-.18**
Sex		.62	.69	.04
Age group		.06	.19	.02
Income		.11	.42	.01
Relationship status		.45	.84	.03
Superstition	.51***	.33	.02	.75***
Total	.68			

Note. N= 158, * $p < .05$, ** $p < .01$, *** $p < .001$.

The levels of superstitious beliefs regarding mahjong differed by education level. An analysis of variance (ANOVA) revealed a statistically significant effect of education levels on the strength superstition regarding mahjong, $F(2, 155) = 9.04$, $MSE = 224.98$, $p < .001$. Scheffe's post hoc tests further revealed that the participants with primary education ($M = 63.61$, $SD = 11.11$) endorsed significantly more superstitious beliefs in comparison to those with tertiary ($M = 48.37$, $SD = 15.39$, $p < .001$) or secondary school qualifications ($M = 53.32$, $SD = 15.86$, $p = .002$).There were no statistically significant differences between the participants with tertiary and secondary qualifications in terms of the levels of superstition.

The participants with primary education, on average, reported the highest mean CPGI scores ($M = 14.14$; $SD = 5.73$) compared to the participants with secondary education ($M = 10.86$; $SD = 7.15$) and those with the university degree ($M = 6.15$; $SD = 4.72$). An Analysis of Variance (ANOVA) revealed a statistically significant effect of education on the mean CPGI scores, $F(2, 155) = 15.46$, $MSE = 39.53$, $p < .001$. Scheffe's tests showed that the mean CPGI scores of the participants with tertiary qualifications ($M = 6.15$; $SD = 4.72$) were significantly lower compared to the mean CPGI scores of the participants with secondary education ($M = 10.86$; $SD = 7.15$) or primary qualifications ($M = 14.14$; $SD = 5.73$), both $p < .001$. There was no statistical difference

between the mean CPGI scores between the participants with secondary qualifications and those with primary qualification.

An independent *t*-tests showed that the mean superstition scale score of problem gamblers ($M = 66.37$) was significantly higher than that of non problem gamblers ($M = 40.03$), $t(144.40) = 19.08$, $p < .001$. Using the cut off score of eight on CPGI, the problem gambling status for each participant was determined (1 = possible problem gambler or 0 = non-problem gambler). Since mahjong superstition explains the largest portion of the variance in CPGI, can the classification of a problem gambling status be possible only from the information on mahjong superstition? Logistic regression was used to test if this classification of problem gambling status based on mahjong superstition is reliable. The results showed that mahjong superstition scores significantly help determining problem gambling status (see Table 4). Overall, a logistic regression model provided a better fit to the data by demonstrating a statistically significant improvement over the intercept-only model (see Table 4 Likelihood Score Test, X^2 (1) = 62.65). Goodness-of-fit statistics assess the fit of a logistic model against the actual outcome (Peng, Lee, & Ingersoll, 2002). Hosner and Lemeshow's test yielded a statistically nonsignificant X^2 (8) of 10.67 ($p = .22$) suggesting that the model fitted well to the data. A logistic regression model with mahjong superstition as a predictor classified 95.1% of problem gamblers and 93.4% of non problem gamblers accurately (see Table 5).

Table 4. A logistic regression analysis of 158 mahjong players to predict CPGI problem gambling status from mahjong superstition

Predictor	**B**	**SE B**	**Wald X^2**	**df**	**p**
Constant	-14.22	2.33	37.4	1	< .001
Superstition	.27	.27	39.0	1	< .001
Test			X^2	df	p
Overall model evaluation					
Likelihood Score Test			62.65	2	< .001
Goodness-of-fit Test					
Hosmer & Lemeshow			10.67	8	.22

Note. $N = 158$. Cox and Snell $R^2 = .63$, Nagelkerke R^2 (Max rescaled R^2) = .84.

Table 5. The observed and predicted frequencies for problem gambling by Logistic regression with the Cutoff of 0.5

	Predicted		
Observed	**Non-problem Gambling**	**Problem gambling**	**% Correct**
Problem Gambling	4	78	95.1%
Non problem Gambling	71	5	93.4%
Overall			94.3%

Note. $N = 158$. Predictor is Mahjong superstition.

Discussion

The current findings supported both hypotheses regarding mahjong superstition. Problem gamblers were found to endorse mahjong superstitions more strongly than non problem gamblers did. In addition, as predicted, education level as well as superstition scores were significant predictors of problem gambling scores. Superstition scores were also capable of classifying people in problem gambler versus non-problem gambler groups with a high degree of reliability. The current study, therefore, confirmed the importance of superstitious beliefs in identifying possible problem gamblers within Chinese communities.

Langer (1975) suggests that superstition is an attempt to establish a form of control over unpredictable or chance-determined outcomes. Similarly, Rothbaum et al. (1982) argue that people are extremely reluctant to relinquish control even when they have no primary control (i.e., unable to change their environment). They propose that, even when people may appear to display helplessness or passivity, they may still seek to exert control indirectly through the process of secondary control which involves aligning oneself with higher powers or forces such as luck to gain more favourable outcomes. As Morling and Evered (2006) point out, however, Rothbaum et al.'s definition of secondary control could be confusing because they assume that the adoption of any form of secondary control is necessarily associated with a relinquishment of primary control. In their definition, therefore, alignment with luck serves to lower expectations to avoid disappointment and that, contrary to the passivity assumption, superstitious beliefs serve to maintain a continuing involvement in gambling and which may lead to signs of problem gambling. The current findings suggest that superstitious beliefs may play a role in the maintenance of gambling behaviour as a means to gain subjective control. For example, the interaction of expertise levels and task difficulty was reported in a study of superstition among golf players (Wright & Erdal, 2008). They reported that proficient golf players endorsed more superstitions during difficult pats than easy one; whereas, novices supported more superstitions during easy tasks than a difficult task (Wright & Erdal, 2008). Thus, the need for subjective control, i.e., superstition, does not necessarily decrease for more experienced players as they still use it when they face a difficult or challenging task.

An exploratory factor analysis of mahjong superstition questionnaire yielded three groupings of superstitious beliefs related to preparations prior to the mahjong session to achieve the best possible outcome, the maintenance of luck during the game, and a means to overcome bad luck when the losses amount. Superstitions are illusory perceptions of control, which are deliberately employed to exert control over a largely uncontrollable game governed by chance. In other words, mahjong superstitions are far from passive resignation or acknowledgement of random outcomes. Although not as strong as problem gamblers did, non-problem gamblers also endorsed some superstitious beliefs. Common superstitious beliefs among gamblers are that regarding acquisition and maintenance of luck. Although superstitions might seem irrational, superstitious rituals such as washing hands or a bathroom break has direct illusory consequences in the mind of mahjong players. Gmelch (2006) reports that professional baseball players maintain many superstitious beliefs and rituals including washing hands after giving up a run (Gmelch, 2006).

Mahjong is a popular game so central to the Chinese culture that superstitious beliefs regarding the game may be an integral part of the Chinese cultural mores. Hence, the superstitious beliefs to change one's luck in mahjong could extend beyond the context of mahjong as a metaphor of general Chinese belief that luck can be maximally exploited by an individual effort. As Raylu and

Oei (2004) argue, the Chinese culture might encourage young people to gamble through family tutelage. Young Chinese may be introduced to gambling as many parents play mahjong in family gatherings and during festivals. The identification with the parental figure who gambles at home is an important channel through which Chinese children are introduced to gambling. Mahjong, although it is a game predominantly played at home, may serve as a gateway to other forms of gambling and may contribute to the process of acculturation to gambling.

The finding that problem gamblers endorse more superstitious beliefs than non-gamblers is in line with previous research by Griffiths and Bingham (2005) and Wood and Clapham (2005) who suggest that problem gamblers tend to be more superstitious than non-gamblers. Superstitious beliefs, as one type of irrational beliefs, fill in the gap between reality and fantasy. It gives the gamblers a type of illusory control over the uncontrollable (Joukhador, Maccallum, & Blaszczynski, 2003). It presents the gambler a source of reason or even power to continue the gambling. Thus, one of the most common superstitious beliefs among gamblers is that concerning with obtaining luck or reversing bad luck. Many gamblers misinterpret the odds of gambling and are more inclined to hold erroneous beliefs of skill and luck (Delfabbro, 2004; Delfabbro & Winefield, 2000). In a national survey of gamblers in Norway, Lund (2007) found that gambling problems in family, beginners' luck and misconceptions about winning chances correlate significantly with the odds for at-risk gambling activities. However, although problem gamblers score higher on cognitive distortion measures, Lambos and Delfabbro (2007) show that this cannot be attributed to lack of statistical knowledge on probability alone. Although average levels of superstitious beliefs are higher among participants with primary education than those with secondary or tertiary education qualifications, the current findings clearly indicate that it is superstition that explains the largest portion of the variance in problem gambling independently above and beyond what education levels can predict. Therefore, if we know the level of mahjong superstition, it is possible to predict the problem gambling score of a mahjong player.

Some limitations of the current study include the representativeness of the sample of participants because of the use of a convenience sample. It was also not possible to control for the individual history of mahjong playing and the skill level of the mahjong players. Further research is also needed to establish if social mahjong games may serve as a gateway to other gambling games in the Chinese community.

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Appendix
Mahjong Superstition Questionnaire (MSQ)

	Very Strongly disagree	Strongly disagree	Disagree	Don't know	Agree	Strongly disagree	Very Strongly Agree
1. In the first round of the mahjong game, you should only score by drawing your own hand. Otherwise, you would lose money by the time mahjong sessions finish.	❑	❑	❑	❑	❑	❑	❑
2. The last player among the four would score most in the last round of a mahjong game.	❑	❑	❑	❑	❑	❑	❑
3. Don't sit by the door as you will lose money.	❑	❑	❑	❑	❑	❑	❑
4. When you are losing, you should wash your hands in the bathroom as this would help changing your luck.	❑	❑	❑	❑	❑	❑	❑
5. When you are losing, you should go to the washroom and pee as this would reverse your bad luck.	❑	❑	❑	❑	❑	❑	❑
6. The seat with the straight back carries the notion that you have something to depend on. And that can increase your luck.	❑	❑	❑	❑	❑	❑	❑
7. Don't lend money before mahjong games, or you will lose money.	❑	❑	❑	❑	❑	❑	❑
8. Don't let anyone touch your shoulder; this will take away luck.	❑	❑	❑	❑	❑	❑	❑
9. When three players already discarded the tile "West", the fourth player cannot discard the tile "One Tube." If you do, all players will die.	❑	❑	❑	❑	❑	❑	❑
10. If you concentrate hard enough, you can draw any mahjong tile that you wish.	❑	❑	❑	❑	❑	❑	❑
11. When you play mahjong, you should wear red underpants. This can strengthen your luck.	❑	❑	❑	❑	❑	❑	❑
12. If you play mahjong right after a haircut, you will lose money.	❑	❑	❑	❑	❑	❑	❑
13. When you are on a roll, don't leave your seat no matter what, as this can help holding your luck.	❑	❑	❑	❑	❑	❑	❑
14. When you play mahjong, don't utter any word that implies losing money (including homophones with losing money).	❑	❑	❑	❑	❑	❑	❑
15. When you are losing during mahjong games, you should turn your underwear inside out. This can help reversing bad luck.	❑	❑	❑	❑	❑	❑	❑